

*PEER-MEDIATED REINFORCEMENT PLUS  
PROMPTING AS TREATMENT FOR OFF-TASK  
BEHAVIOR IN CHILDREN WITH  
ATTENTION DEFICIT HYPERACTIVITY DISORDER*

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Functional analyses revealed that peer attention was one variable maintaining the off-task behavior exhibited by 3 students with a diagnosis of attention deficit hyperactivity disorder (ADHD). Peer-mediated reinforcement plus prompting was then used to reduce off-task behavior in a simulated classroom environment. Implications for future applications of this procedure with children diagnosed with ADHD are discussed.

DESCRIPTORS: attention deficit hyperactivity disorder, functional analysis, off-task behavior, peer-mediated treatment

Researchers have recently begun to use analogue behavioral analyses to improve our understanding of, and ability to treat problem behaviors associated with the diagnosis of attention deficit hyperactivity disorder (ADHD) (Broussard & Northup, 1997; Neef, Bicard, & Endo, 2001). For example, Broussard and Northup used functional analysis methods to determine the effects of peer attention on disruptive classroom behavior displayed by children with ADHD. They provided participants with access to peer interaction contingent upon the absence of disruptive behavior and used a classroom-wide intervention wherein peers could earn access to preferred items or activities contingent on not attending to participants' disruptive behaviors. Jones, Drew, and We-

ber (2000) delivered noncontingent peer attention to reduce disruptive behavior exhibited by a student with ADHD. However, no study has examined the utility of training specific peers to differentially reinforce on-task behavior and extinguish off-task behavior in children with ADHD. The purposes of the present study were (a) to replicate and extend functional analysis procedures to assess off-task behavior exhibited by children with ADHD and (b) to examine the efficacy of peer-mediated reinforcement of alternative behavior (DRA) plus prompting as a treatment for off-task behavior maintained by peer attention.

## METHOD

### *Participants and Setting*

Participants were 3 10-year-old children (Amy, Paul, and Steve) who had been diagnosed with ADHD by their primary care physician, had a score in the borderline or clinical range on the attention subscale of the Childhood Behavior Checklist (Achenbach & Edelbrock, 1983), and exhibited off-task behavior at school. None of the participants received medication. All sessions were conducted at a university psychology de-

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partment in a large clinic room designed to look like a classroom.

### *Response Definitions and Data Collection*

Independent variables were off-task behavior and number of math problems completed. Off-task behavior was defined as looking away from an assigned task for 3 s or more (unless participants were counting on their fingers). Trained observers were situated behind a one-way mirror and used laptop computers to record the occurrence of off-task behavior using 10-s partial-interval recording. Sessions lasted 10 min, except that the two demand conditions were extended 30 s for each escape period to a maximum of 20 min. A second observer independently collected data during 35% of sessions. Interobserver agreement was assessed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Mean total agreement scores for the functional analyses were 93%, 87%, and 90% for Amy, Paul, and Steve, respectively. Mean total agreement scores for the treatment evaluations were 96%, 88%, and 89% for Amy, Paul, and Steve, respectively. Data on the correct implementation of all procedures (i.e., integrity) were also collected for both functional analysis and treatment conditions. Integrity data were collected during at least 27% of functional analysis sessions for each participant and averaged 94%, 84%, 88%, 93%, and 96% during the teacher-attention, peer-attention, escape (easy), escape (difficult), and structured classroom conditions across participants, respectively. Integrity data were collected during at least 43% of treatment evaluation sessions for each participant and averaged at least 80% for each participant.

### *Functional Analysis*

Six functional analysis conditions were randomly alternated in a multielement design. Before all functional analysis and treat-

ment sessions, participants were told only that it was time to go into the classroom and work on math problems. No other instructions were delivered. During the teacher- and peer-attention conditions, participants were given math problems and a teacher or confederate peer provided a reprimand contingent on off-task behavior. For all attention and escape conditions, an experimenter notified the teacher or peer when the participant was off task through the use of a vibrating pager. Two escape conditions were conducted. During the escape (easy) condition, participants were asked to perform skill-appropriate math problems (i.e., 95% to 100% accuracy, as determined by a prior assessment). During the escape (difficult) condition, participants were asked to perform difficult math problems (i.e., 33% to 50% accuracy, as determined by a prior assessment). In both escape conditions, the participant's work was removed by a teacher for 30 s with no comment contingent on off-task behavior. During the control condition, a moderately preferred activity (i.e., mazes or word searches), as determined by a prior stimulus preference assessment, was presented to the participants and the teacher delivered a comment (e.g., "That is a tough maze!" or "good job") to the participant on a fixed-time 30-s schedule. The purpose of this condition was to control for teacher attention and the presence of task demands. During the alone condition, no other people were present and participants were given skill-appropriate math problems and were observed through the one-way mirror. The purpose of the alone condition was to determine the extent to which off-task behavior occurred in the absence of social contingencies.

### *Treatment Evaluation*

A reversal design was used to evaluate treatments for Amy and Steve. A combination reversal and alternating treatments de-

sign was used to evaluate treatment for Paul. To address off-task behavior that occurred during the peer-attention condition, peer-mediated DRA plus prompting was used. Baseline conditions were identical to the peer-attention condition of the functional analysis. During treatment, participants were told that they and the confederate would need to work together on the math assignment. The confederate peer then delivered continuous social approval (e.g., "Wow, we are going fast now!", high fives) contingent on on-task behavior of the participant. Contingent upon each occurrence of off-task behavior, the confederate peer delivered a statement prompting the participant to engage in on-task behavior (e.g., "Let's get moving!"). If the participant did not resume on-task behavior, the confederate peer withdrew eye contact and verbal interaction until the participant resumed on-task behavior (the extinction component of DRA). For Paul, a second treatment involved the DRA-plus-prompting procedure described above plus access to preferred items contingent upon completion of each page of math problems. Paul turned in his completed math work to the experimenter immediately after each session and received access to preferred items at that time.

## RESULTS AND DISCUSSION

Figure 1 depicts the results of the functional analysis for each participant. All participants exhibited elevated levels of off-task behavior in the alone and peer-attention conditions. In addition, all participants completed fewer math problems during the alone and peer-attention conditions (data not shown). Figure 2 shows the results of the treatment evaluation in the peer-attention condition for each participant. Off-task behavior occurred at high levels during baseline conditions for all participants. For Amy and Steve, DRA plus prompting was effective

in reducing off-task behavior to low levels. For Paul, DRA plus prompting was only moderately effective in reducing off-task behavior. DRA plus prompting plus access to preferred items contingent on math-problem completion was effective in reducing off-task behavior to low levels. In addition, for all participants, more math problems were completed during treatment conditions than during baseline conditions (data not shown).

These results support the use of functional analysis methodology and peer-mediated reinforcement for the assessment and treatment of off-task behavior exhibited by children diagnosed with ADHD. This study also contributes to the literature on functional assessment and treatment with the ADHD population in a number of other ways. First, off-task behavior, rather than disruptive behavior, was the dependent variable. Second, the utility of additional functional analysis conditions (e.g., alone, control) was examined in this study. The control condition appears to have adequately controlled for teacher attention and the presence of task demands, but it did not include a peer. Future research examining a control condition for peer attention is warranted. Although high levels of off-task behavior were observed during the alone condition, suggesting maintenance by nonsocially mediated sources of reinforcement, it is not too surprising that young children would be off task in this condition. In other words, many children without ADHD may exhibit off-task behavior without teacher supervision. Future research on how to best design and interpret this condition is needed. A final contribution is that although previous research has evaluated differential reinforcement of other behavior and noncontingent reinforcement as treatment for attention-maintained behavior, no study has examined peer-mediated reinforcement plus prompting as a treatment.

One concern with the peer-attention con-

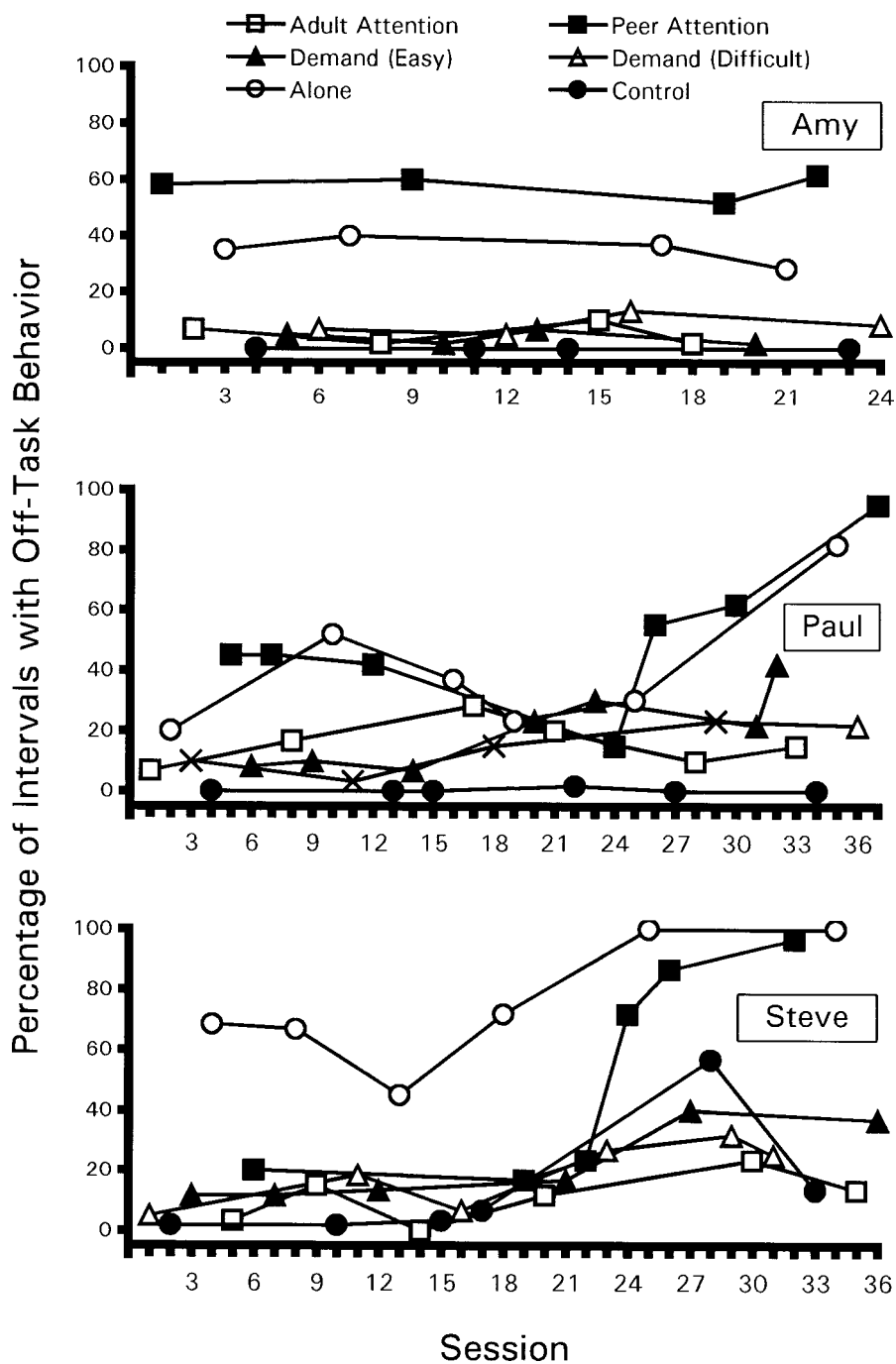


Figure 1. Results of the functional analysis for Amy (top panel), Paul (middle panel), and Steve (bottom panel).

dition used in this and other studies is that many students' behavior might be particularly sensitive to it. That is, even if a stu-

dent's off-task behavior is not initially maintained by peer attention, it may be a powerful consequence for many students and

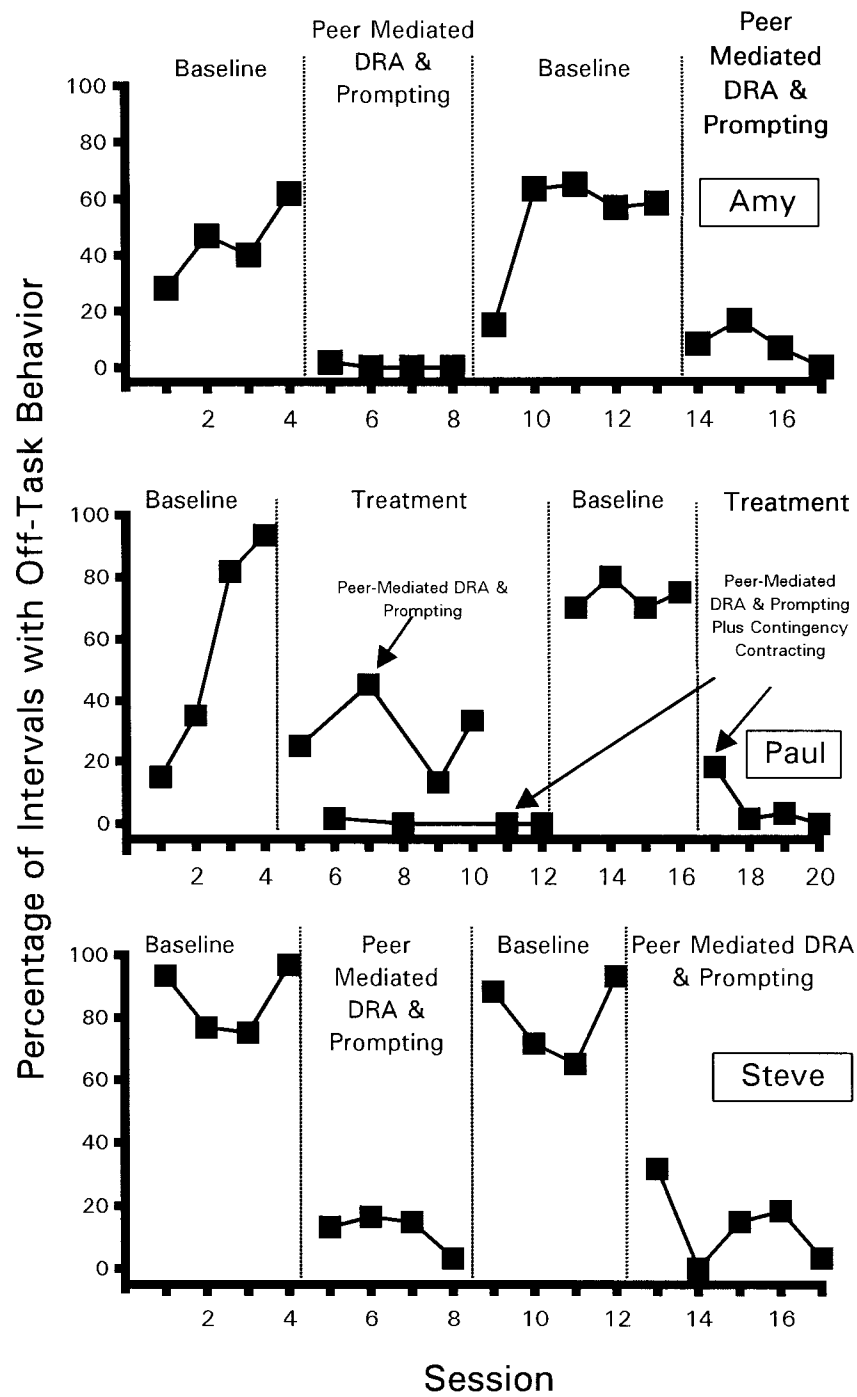


Figure 2. Results of the treatment evaluation for Amy (top panel), Paul (middle panel), and Steve (bottom panel).

thus may become a maintaining variable during the peer-attention condition of the functional analysis. Future research should evaluate this possibility. Finally, because this study was conducted in a simulated classroom environment, the extent to which the results reflect contingencies in operation under natural classroom conditions is unclear. Future research should examine the effectiveness of peer-mediated DRA plus prompting in actual classroom settings.

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